Consumer Involvement for QR Code Applications, the Digital DNA of Brands[1]

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Abstract

The purpose of the research is to determine the relationship between consumer involvement in QR code applications and purchasing decision involvement and the effect level of this relationship. Generation Z consumers constitute the population of research. Since it was not possible to reach the entire generation Z within the scope of the research, the research was carried out using the purposeful sampling method, which is one of the non-probability sampling types. The research was conducted online, and the relationships between variables were tested over the data of 394 people participating in the study, and the accuracy of the hypotheses formed was tested. In the analysis of the data, descriptive statistics, correlation analysis and multiple linear regression analysis were performed using the statistical package program. As a result of the research, it was determined that there is a moderate and significant (p<0,001) relationship between the variables of "hedonic value" (r=,575; p=,000) and "perception towards the brand" (r=,643; p=,000), and the "purchase decision involvement" variable, which are sub-dimensions of consumer involvement towards QR code applications. At the same time, it is another result of the research that the variables of "hedonic value" and "brand perception", have a statistically significant effect on the purchasing decision.

Key words: Consumer Involvement, QR Code, Phygital Marketing, Generation Z

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1. Introduction

Considered as the object of marketing communication until the 21st century, the consumer has become the subject of marketing communication today. For this

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reason, brands should not ignore the fact that the product or service they offer to the market is compatible with their new lifestyles. Because whether online or offline, marketing communication is the voice of companies and brands, and it connects the brand with consumers, events, experiences or emotions (Moravcikova & Kliestikova, 2017).

Both the increase in globalization and the increasing strength of the interaction between the physical and digital world with each passing day necessitate the evaluation of online and offline approaches together in marketing activities. As a matter of fact, today's professional companies accept online and offline marketing activities as complementary to each other, not as an alternative, and are accelerating their efforts in this direction. It can be said that phygital marketing communication, which is expected to become more widespread day by day with the effect of these developments, is an effective instrument that can be used to reach today's consumers. As a matter of fact, this new marketing approach has a unique position as it can be combined with traditional marketing practices and new applications offered by the digital world.

Phygital marketing communication activities can be carried out with many different technological infrastructures. Therefore, although it is possible to mention many applications specific to the technological infrastructure used, these applications can be evaluated under three main headings. These are QR code applications, augmented reality applications and mapping technologies. Thanks to the QR code applications, which constitute the subject of the research, brands can reach their customers through interesting marketing campaigns. These experiences are particularly important in the age of online shopping as they help customers explore 3D views of a brand's offering without having to leave their homes (Farshid et al., 2018).

Due to the fact that digital applications are a part of phygital marketing, generation Z, which is an important user of today's digital communication tools, has a critical importance in physical marketing communication. Because generation Z is among the active users of digital applications, whose use is becoming more and more widespread day by day. In other words, the members of generation Z have grown up in a phygital culture where any information they want can be accessed at any time, through the channels they want and from the sources they want. Brands can also benefit from this change and establish stronger bonds with members of the generation Z thanks to phygital applications. The reaction of generation Z to phygital applications is extremely important. Because this generation will play an active role in the marketing world of the future. For this reason, it is important to measure the reaction of generation Z to applications in this field and to analyze the behavior of the members of generation Z as a consumer in obtaining the desired results from phygital marketing activities. Another important issue is determining the effect of phygital marketing communication on the level of involvement of generation Z and developing strategies to increase this effect.

Consumer involvement has a personal characteristic in part because it expresses the personal importance that the consumer attaches to something (product, brand, advertising message, etc.) and the connection he establishes between him and his own life. On the other hand, consumer involvement is a mental state variable in terms of showing the consumer's reaction to stimuli. In addition, involvement affects the depth of information processing of the consumer. Because the intensity of the cognitive effort to be spent and the degree of elaboration of the message depend on the level of consumer involvement (Ulusu, 2016). Therefore, it can be said that one of the important areas affected by the developments in the digital transformation era is consumer involvement. Consumer involvement, which is both a personal characteristic and a mental state variable, is among the areas that should be most sensitive to the transformation and change in society. In this context, it was investigated whether there is a meaningful relationship between the variables of "hedonic value" and "perception towards the brand" and the "purchase decision involvement" variable, which are sub-dimensions of consumer involvement towards QR code applications. In the study, it was also investigated whether the sub-dimensions of consumer involvement towards QR code applications had a statistically significant effect on "purchase decision involvement".

2. Literature Review

2.1. Phygital Marketing

It has been observed that the industry 1.0 approach, which started with the replacement of manpower by machines in the industrialization process, was replaced by the industry 2.0 approach with the transition to mass production. Then, with the transition to automation in production, industry 3.0 was born and industry 4.0 transformations were experienced with the era of smart factories where digitalization was placed at the center. Japan presented Industry 5.0 to the public at CEBIT 2017, one of the world's largest IT fairs. The digitalization-oriented Industry 4.0, which ignores the human aspect, the unity of mind and spirit, has been replaced by Industry 5.0, which allows people to be together with different technologies (Odabaşı, 2019). On the other hand, a similar transformation has been experienced in the field of marketing over the years. At the point where both transformations have come, there is an interaction between the digital world and the physical world. At a time when these developments were taking place, phygital marketing was born.

The concept of phygital is often referred to as omnichannel customer experience. It is a multi-channel approach to selling products or services that aims to turn online, telephone or in-store purchases into seamless customer experience (Moravcikova & Kliestikova, 2017). Applications within the scope of phygital marketing can be carried out in a wide variety of media, from sales stores to outdoor advertising, or from printed magazines to fairs. On the other hand, these applications provide many social and psychological benefits as well as attracting the attention of consumers. For example, a phygital store requires fewer salespeople than a normal retail store. Also, since there is no inventory, less people are needed for stock management. Refunds are processed automatically. This means that the only workforce required is to advise the client (Mustajbasic, 2018).

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Phygital marketing communication activities can be carried out with many different technological infrastructures. All these studies can be evaluated under three main headings. These are QR code applications, augmented reality applications and mapping technologies. Since QR code applications constitute the scope of the study, firstly, QR code applications were mentioned and the interaction of these applications with consumer involvement was explained by considering the studies in this field in literature.

2.2. QR Code Applications

The QR code is a two-dimensional barcode made up of specially arranged small black and white squares, released in 1994 by the Japanese company Denso-Wave. Although the QR code application was originally used to track inventory in the production of vehicle parts, it is now used in many different industries. QR is called "Quick Response Code" because it aims to allow the content of the code to be decoded at high speed (Rouillard, 2008).

The QR code offers various benefits and facilities due to its structure: In general, these codes can be easily read by the machine thanks to the built-in camera in mobile devices. Users can easily access various services by scanning the code or taking photos (Okazaki et al., 2011). The fact that mobile devices are so useful, and their usage is increasing day by day has paved the way for the development of mobile advertising. As a matter of fact, as a result of a study, it has been determined that consumers who seek reliable and informative content are positively affected by mobile advertising campaigns that benefit from the QR code potential (Atkinson, 2013). Another important convenience of the QR code is that customers can choose when to access existing marketing materials. The fact that it is sufficient to take a QR code photo with just a smart phone provides this opportunity for users to access the relevant content (Ramkumar, 2008). In addition, phone numbers, web links, e-mail addresses or business card information can be placed in QR codes, additional information about a brand can be transmitted to the consumer, consumers can be included in a promotion and gifts / discounts can be given. On the other hand, thanks to QR code applications, shared content can be downloaded, and permission can be obtained for mobile communication. Printed advertisements can be made interactive by directing them to a website, SMS / MMS sending or promotional film. Consumers can access online sales sites using QR code and shop with mobile payment (Bozkurt & Ergen, 2011). Allowing access to digital content by enabling QR codes on printed advertising materials makes these applications more engaging, immersive and interactive, as it allows consumers to interact with advertisements anytime and anywhere. Thanks to QR code applications, it is possible to access detailed product information, coupons and special offers, insights about product usage and benefits, customer feedback forms, brochures and similar marketing materials and social media links (Sago, 2011). In addition, additional content, information requests, URL redirections, videos, games and music downloads are among the possibilities offered by QR code applications (Sharma & Wildman, 2009). Thanks to all these features, QR code applications have become an

interesting tool that advertisers can use for desired marketing actions, from providing detailed product information to making purchase orders.

When literature is examined, it is possible to find many studies on the awareness of QR code usage, the general profile of QR code users, and the positive effects of QR code use on consumers. For example, Sago (2011), in his study to determine the level of use and effectiveness of QR codes among university students in the USA, found that the level of adoption of QR codes was low, on the other hand, men were more interested in QR code applications than women. In the study conducted by Özkaya et al. (2015), it was found that continuous users use QR code applications more than experiential users and there is a positive relationship between electronic device ownership and QR code use. In a study conducted in the USA, which investigated the role of the use of QR codes in the wine purchase decision of the consumer, it was concluded that consumers who enjoy talking about wine and are interested in wine produced are more likely to use QR codes in their wine purchasing decisions. On the other hand, in some studies, it has been emphasized that the adoption of QR code applications depends on both the ease of use and the perceived usefulness of the technology (Higgins et al., 2014). For example, in a study conducted by Jung et al. (2012), it was found that the intention of consumers to use QR codes is largely influenced by informational value and then by entertainment and perceived ease of use. It is also among the other results of the study that consumers with previous experience of QR codes are more likely to use QR codes in the future. As a result of the research conducted by Albăstroiu & Felea (2015), it was determined that the participants knew how to use QR code applications, used QR code applications for accessing information about products and online purchases, and QR code applications contributed to the improvement of shopping experiences. In a study conducted on university students in the USA, it was concluded that 54% of the students using QR code applications used for information purposes and 23% for purchasing purposes (Probst & Brokaw, 2012). A study by Li & Messer (2019) has shown that consumer preferences for a product are affected by the amount of information provided and accessed, and additional information created using a QR code can reduce the misconceptions of consumers about a product.

All these benefits of QR code applications and their increasing effect on consumers have enabled it to have a privileged position in today's marketing communications. QR code applications also function as an important instrument of phygital marketing as it enables the integration between print media and the online world to be processed faster. Therefore, QR code applications are an important bridge between digital marketing tools and printed advertisements, coupons, signs, sales promotion, etc., which are among the traditional marketing communication methods (Sago, 2011). Because QR code applications can be used with different promotion types, they can offer users richer and more interactive marketing content. According to a study, 88.4% of mobile users have a QR code reader on their mobile devices and 83.6% have used QR code applications at least once. Therefore, QR code applications play an important role in filling the gap between advertised media

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and promotional sites as they can be used with different media tools such as magazines, newspapers, posters, etc. (Okazaki et al., 2011).

2.3. Consumer Involvement

Although it is one of the concepts frequently used in literature, there is no consensus on the definition of involvement. Johnson & Eagly (1989) defines involvement as a motivational situation caused by a relationship between an activated attitude and self-concept. The concept of involvement was first considered in the context of persuasive communication. In this context, Sherif et al. (1965) put forward the "Social Judgment Theory" (Social Judgment Theory is the theory that deals with how individuals evaluate incoming messages and change their attitudes accordingly) and pioneered the current of thought about how involvement affects persuasion.

According to Krugman (1965), who was the first person to introduce the concept of involvement into marketing literature, involvement is the bridge, link, or number of personal references that the consumer consciously establishes between his own life and the stimulus within a minute, rather than attention, interest or excitement. Today, marketers have started to use the virtual world frequently to interact with consumers and increase engagement. The average interaction time with brand advertising, which is only 12 seconds in traditional online advertising, is up to 10 minutes in the virtual world, reveals the importance of studies in this field (Vel et al., 2015).

Much of the literature conceptualizes involvement as a highly cognitive construct. However, the opinions arguing that involvement is handled over cognitively and that emotional and commitment dimensions are ignored have started to gain strength (Kandemir et al., 2013). Consumer involvement has a personal characteristic in part because it expresses the personal importance that the consumer attaches to something (product, brand, advertising message, etc.) and the connection he establishes between him and his own life. On the other hand, consumer involvement is a mental state variable in terms of showing the consumer's reaction to stimuli (Ulusu, 2016).

As explained above, consumer involvement has both cognitive and emotional dimensions and attachment dimensions. This situation also affects the level of involvement of the consumers on the basis of the product. For example, if the level of involvement is evaluated on a product basis, studies have shown that the level of involvement in technological products is higher than in other product groups. In a study conducted by Coşkun (2018), participants were asked questions about purchasing decisions in different product groups in order to measure the level of involvement of consumers. With these questions, the involvement levels of the participants in the product groups were determined. As a result of the study, it was seen that the products with the highest level of involvement were mobile phones, real estate and computers, while the products with the lowest involvement were cola pasta and shopping malls.

It is worth mentioning the consumer involvement of the generation Z, which is among the target groups in phygital marketing applications and whose weight in the market will increase day by day in the future. Generation Z members have various expectations from today's companies in meeting their needs. The first of these is that they want the brand they will purchase to be available on all channels. Over the years, the increasing number of brands and technology possibilities has strengthened the consumers even more and this has made them more demanding day by day. As a result, today's customers determine themselves when, where and how they will interact with a brand. Therefore, the decisive factor in the shopping process is not the retailer but the consumer (Van Tichelen, 2019). Another expectation of the members of generation Z from today's brands is that they offer unique experiences that trigger their emotions. Generation Z members seek companies that offer exciting and unique experiences that they can share with friends and relatives. A study found that 86% of members of this generation are willing to pay more for a great customer experience (Kulbyte, 2021). Dreyer (2018) stated that the experience of purchasing something for generation Z is as important as the product itself. Another expectation of the members of the generation Z from the companies is personalized services.

According to a customization report published by the Segment (2017), today's customers are even ready to spend more to get a special service. 44% of consumers said they would likely become a repeat purchaser after a personalized shopping experience with a company. Customers love personalized service because it makes them think that they are unique and important to the brand. In another study, it was found that consumer involvement directly affects the purchase intention, trust in the brand has a regulatory role in the relationship between involvement level and purchase intention, and as the power of the regulatory effect increases, the purchase intention also increases. Another study has shown that individuals with low level of involvement have low purchase intentions, while individuals with high level of involvement are high. In addition, sensitivity to price is very low in individuals with a high level of involvement (Çetinkaya, 2020).

As mentioned in various parts of the study, QR Code applications attract customers. Therefore, it is possible to say that there is a significant interaction between QR code applications and customers. As a matter of fact, when literature is examined, it is possible to find studies on the positive effects of QR code applications on consumers and their effects on purchasing behaviors. For example, in a study conducted by Trivedi et al. (2019), it was concluded that QR code applications drive the purchase intention in a low-participation product category as well as emotional appeal, and that ads for high-participation products are beneficial if they are combined with interesting information provided by QR code applications. In the study conducted by Hossain et al. (2018), it was concluded that QR code applications affect the perceived flow, and their combined effect also increases the satisfaction levels of online shoppers and finally affects their purchase intention. The results of the study conducted by Shin et al. (2012) showed that user intentions and behaviors were affected by QR code applications. Findings from three studies conducted in Japan show that QR code applications are largely used

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in print media to encourage loyalty programs. In the same study, it was determined that the main factors that push companies to use QR codes are convenience, savings and quality (Okazaki et al., 2012).

3. Methodology

The purpose of the research is to determine the relationship between consumer involvement in QR code applications in the context of phygital marketing communication and purchasing decision involvement and the effect level of this relationship. Accordingly, generation Z consumers constitute the target population of the study. However, the purposeful sampling method, one of the non-probabilistic sampling types, was used in the study due to the time constraint, cost and difficulty of sampling access to all generation Z consumers. The research was conducted online between 12-26 February 2021. Within the scope of the research, questionnaire forms filled out by 398 participants were collected. Since 4 questionnaire forms contain incomplete and erroneous data, analyzes were conducted over 394 questionnaires.

3.1. Research Gap

In contemporary marketing literature, the integration of physical and digital environments—commonly referred to as phygital marketing—has gained significant attention due to its transformative impact on consumer-brand interactions. However, despite the increasing adoption of phygital tools such as QR codes, augmented reality, and mapping technologies, the empirical understanding of their specific effects on consumer involvement and decision-making processes remains fragmented and underexplored.

Existing studies predominantly focus on general technological adoption (Okazaki et al., 2011; Jung et al., 2012) or specific aspects of QR code usage, such as its informational and functional benefits (Li & Messer, 2019). However, these studies often overlook the emotional (hedonic) and cognitive (brand perception) dimensions of consumer involvement and how these factors collectively influence purchasing decisions. Moreover, while Generation Z is frequently highlighted as a key demographic in digital marketing due to their high engagement with technology, limited empirical research specifically addresses their interaction with phygital tools like QR codes and the subsequent impact on their consumer behavior.

Thus, this study addresses two critical research gaps:

- The Role of Emotional and Cognitive Dimensions in Phygital Marketing: While previous studies have examined individual aspects of consumer involvement (e.g., enjoyment, usefulness), they fail to provide a holistic view that integrates hedonic value and brand perception as dual predictors of purchasing decision involvement within a phygital context.
- Generation Z as the Target Demographic: Despite Generation Z's unique digital nativity and their pivotal role in shaping future marketing trends, there is insufficient research exploring their specific responses to

phgital marketing tools like QR codes. Existing literature largely focuses on older consumer groups or treats Generation Z as a homogeneous digital audience, neglecting the nuanced ways in which phygital applications influence their cognitive and emotional engagement.

By addressing these gaps, this study contributes to the literature by:

- Theoretical Advancement: Expanding the conceptual understanding of consumer involvement in phygital marketing through the integration of hedonic and brand perception dimensions.
- Practical Insights: Providing actionable strategies for marketers to effectively target and engage Generation Z using QR code applications as a bridge between digital and physical marketing environments.

This research not only sheds light on the evolving consumer dynamics in phygital contexts but also establishes a foundation for future inquiries into the interplay between emerging technologies and consumer behavior, particularly among digitally native demographics.

3.2. Data Collection Method and Tool

Survey technique, one of the most common / quantitative data collection methods, was used to obtain primary data in the study. The questionnaire form used in the research consists of 2 parts. In the first part, the "Enduring Involvement Scale", which was built using Higie & Feick (1989) study, and the "Purchase-Decision Involvement Scale" adapted from the studies of Mittal (1989) and Kandemir et al. (2013) were used. Both scales were fictionalized and used within the scope of QR code applications of brands. The second part of the questionnaire consists of questions to determine the demographic characteristics of the participants.

The research questionnaire was prepared in Turkish. There are a total of 19 questions in 2 parts in the prepared questionnaire. The initial 14 observed variables consist of statements prepared according to the Likert scale constructed within the scope of the research model. While creating the observed variables, a detailed literature study has been done. The scales used in studies published in the relevant national and international literature were used while creating the attitude expressions in the questionnaire. In addition, in this study, scale expressions were constructed over QR code applications.

All of the expressions in the scales created in order to determine the effects of the involvement of the generation Z consumers, also referred to as digital natives, on their purchasing decision involvements were scaled according to the 5-point Likert scale. Statistical package program was used to analyze the research.

3.3. Limitations of the Study

The data of the study were obtained from generation Z consumers who have experience in using QR codes by using purposeful sampling methods due to time constraint, cost and difficulty of sampling access. In this context, the

generalizability and external validity of the research results are limited. Another limitation of the study is that consumer involvement towards QR code applications, which is only one of the phygital marketing methods, is taken into consideration. Other phygital marketing methods were not included in the scope of the research. Therefore, another limitation is that the scale expressions of the research were constructed only on QR code applications. In addition, the results of the research are limited to the dates when the research data were collected, 12-26 February 2021.

3.4. Determining Test Statistics and Editing Data

The data collected as a result of the research was analyzed using a statistical package program. After the data entry was completed, the statistical tests to be used in data analysis were determined. When determining the statistical tests to be made on a data group, it should be analyzed whether the data is normally distributed or not. If the data is distributed normally, the analysis should be done using parametric tests, if not normally, non-parametric tests. As a result of the kurtosis and skewness test performed on the research data, it was determined that the data were between -1.5 and +1.5 and the data showed a normal distribution (Tabachnick & Fidell, 2007). In this context, descriptive statistics factor analysis correlation analysis and multiple linear regression analysis were performed to evaluate the data obtained as a result of the research.

3.5. Findings

The results obtained by analyzing the research data are given below:

3.5.1. Socio-Demographic Characteristics of Participants

In this section, descriptive statistics related to socio-demographic variables such as gender, average age, occupation, education level and monthly income of the family, which determine the participant profile in the last part of the questionnaire, are included.

When Table 1 is examined, it is seen that 51.5% of the participants are men and 48.5% are women. The average age of the participants is 20.13. On the other hand, when the educational status of the participants is examined, it is seen that 8.6% of the participants are high school students, 14.2% are associate degree students and 77.3% are university students. In addition, when we look at the professions of the participants, it is seen that 3.3% of the participants are civil servants, 0.8% are private sector employees and 95.9% are students. Finally, when the monthly income status of the families of the participants is examined, it is seen that 2.0% of the participants have an income level of 3000 TL or less. Participants with the highest income level make up 31.5% of the total participants and have an income of 7501 TL and above. When the participant profile is examined, it can be said that the participant profile indicates a distribution in harmony with the realities of life. (The number of female and male participants is close to each other, the level of general education is high and the majority of the participants are still students, etc.) Because this study was carried out on generation Z. Participant characteristics also overlap with the basic characteristics of generation Z. Because the largest

representative of generation Z, which is used for those born in 1997 and after, is still 24 years old, many of them are still students and their education level is high.

Table 1. Socio-Demographic Characteristics of the Participants

Demographic Variables	Value	Frequency	Percent	Demographic Variables	Value	Frequency	Percent
Gender	Male	203	51,5	Education Level	High school	34	8,6
	Female	191	48,5		Associate degree	56	14,2
	Total	394	100		University	304	77,2
					Total	394	100
Average Age		20,13					
Occupation	Civil Servant	13	3,3	Monthly Income of The Family	3000 TL and Below	8	2,0
	Private Sector Employees	3	,8		3001 – 4500	26	6,6
					4501 – 6000	70	17,8
	Student	378	95,9		6001 – 7500	166	42,1
					7501 TL and Above	124	31,5
	Total	394	100		Total	394	100

Source: Authors' calculations

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3.5.2. Factor Analysis of Consumer Involvement for QR Code Applications and Purchasing Decision Involvement Scale

Factor analysis was conducted to find out how many sub-dimensions the "Consumer Involvement for QR Code Applications and Purchasing Decision

Involvement Scale" was perceived. The suitability of the data for factor analysis was tested with KMO and Barlett tests.

Table 2. Factor Structure of Consumer Involvement for QR Code Applications and Purchasing Decision Involvement Scale

	Factor	Variables	Factor Loads			Cronbach Alpha	x̄	α
			1	2	3			
Consumer Involvement for QR Code Applications	Hedonic Value	Q1 I find the QR code applications of brands fun.	,809			,861	4,00	1,05
		Q2 I find the QR code applications of brands interesting.	,771				3,92	,97
		Q3 I find the QR code applications of brands appealing.	,759				3,73	,96
		Q4 I find the QR code applications of brands exciting.	,691				3,61	1,02
		Q5 I find the QR code applications of brands fascinating.	,675				3,70	1,03
	Perception Towards The Brand	Q9 QR code applications of brands reflect the brand's image.		,791		,852	3,94	,96
		Q8 QR code applications of brands tell consumers something about the brand.		,724			3,72	1,00
		Q10 QR code applications of brands provide me with information about the brand.		,717			3,85	1,01
		Q7 QR code applications of brands are a part of their corporate image.		,671			3,72	,96
		Q6 QR code applications of brands tell me something about the brand.		,645			3,70	1,00
	Purchasing Decision Involvement	Q13 QR code applications are effective in making the right choice regarding a brand's product / service.			,819	,889	3,25	1,09
		Q14 QR code applications reduce my anxiety about selection when purchasing a brand's product / service.			,813		3,30	1,03
		Q12 QR code applications differentiate the brand's product / service from other brands.			,767		3,44	1,09
		Q11 I consider QR code applications when purchasing a brand's product / service.			,743		3,50	1,11
	Eigenvalue		6,94	1,35	1,12			
	Explained Variance		23,50	22,02	21,79			
	Total Explained Variance		67,31					
	KMO		,910					
	Barlett		3188,809 (sd.91; p=,000)					
	Cronbach Alpha		,921					

Source: Authors' calculations

When Table 2 is examined, it is possible to make the following comments; Firstly, no question was removed from the scale as no variable with a factor weight close to each other was found under more than one factor as a result of the factor analysis of "Consumer Involvement for QR Code Applications and Purchasing

Decision Involvement Scale". The suitability of each variable for factor analysis was reviewed using the Measure of Sampling Adequacy (MSA) method to review the anti-image correlation matrix of the variables. When the MSA values in the anti-image correlation matrix were examined, it was found that all variables were above 0.50. Three factors obtained as a result of factor analysis explain 67.31% of the total variance. When the results of the Cronbach's Alpha analysis conducted for the "Consumer Involvement for QR Code Applications and Purchasing Decision Involvement Scale" were examined, it was found that the internal consistency levels of all scales were above the critical limit of 0.60. The discriminative validity of the scales used in the study was tested by factor analysis. The scale expressions used in the study were subjected to factor analysis, (KMO = 0.910; p <0.001) and three sub-factors were obtained in which the scale expressions had a consistent association. On the other hand, when the descriptive statistics results were examined, it was determined that the expression "I find the QR code applications of brands fun. ($\bar{x}$=4.00)", one of the observed variables of the *Hedonic Value*, one of the sub-dimensions of *Consumer Involvement for QR Code Applications*, has the highest average. In the sub-dimension of *Perception Towards the Brand*, it was determined that the expression "QR code applications of brands reflect the brand's image ($\bar{x}$=3.94)" has the highest average. In the *Purchasing Decision Involvement* factor, it was concluded that the participants agreed with the statement "I consider QR code applications when purchasing a brand's product/service ($\bar{x}$=3.50)" at the highest level.

3.5.3. Correlation and Multiple Linear Regression Analysis

Within the scope of the research, the relationships between sub-dimensions of "Consumer Involvement for QR Code Applications" and "Purchasing Decision Involvement" variables were examined. Correlation analysis and multiple linear regression analysis were performed to test the hypotheses established in line with the research model. The hypotheses created to determine the relationship and level of effect between "Consumer Involvement for QR Code Applications" and "Purchasing Decision Involvement" are as follows:

- **H₀** Sub-dimensions of "Consumer Involvement for QR Code Applications" are statistically insignificant in explaining the "Purchasing Decision Involvement" variable.
- **H₁** Sub-dimensions of "Consumer Involvement for QR Code Applications" are statistically significant in explaining the "Purchasing Decision Involvement" variable
  - H₁ₐ *Hedonic Value*, sub-dimensions of "Consumer Involvement for QR Code Applications", directly and significantly affects the "Purchasing Decision Involvement".
  - H₁ᵦ *Perception Towards the Brand*, sub-dimensions of "Consumer Involvement for QR Code Applications", directly and significantly affects the "Purchasing Decision Involvement".

Table 3. Correlation Analysis of the Relationship between Sub-dimensions of Consumer Involvement for QR Code Applications and Purchasing Decision Involvement

			Consumer Involvement for QR Code Applications		Purchasing Decision Involvement
			Hedonic Value	Perception Towards The Brand	
Consumer Involvement for QR Code Applications	Hedonic Value	r	1		
		p			
	Perception Towards The Brand	r	,614**	1	
		p	,000		
	Purchasing Decision Involvement	r	,575**	,643**	1
		p	,000	,000	
**. The correlation is significant at the 0.01 level. (2-tailed).					

Source: Authors' calculations

When Table 3 is examined, significant relationships were found between the "Purchasing Decision Involvement" dependent variable and sub-dimensions of "Consumer Involvement for QR Code Applications" independent variables. In this context, it has been determined that there are moderate and significant (p<0,001) relationships between *hedonic value* (r=,575; p=,000) and *perception towards the brand* (r=,643; p=,000) variables, which are sub-dimensions of "Consumer Involvement for QR Code Applications" and "Purchasing Decision Involvement".

The correlation coefficient r=0.575 and p value p<0.001. This result shows that hedonic value has a moderately strong and positive relationship with purchase decision interest. Hedonic value represents the degree to which consumers find QR code applications fun, interesting and exciting. This finding reveals that when consumers perceive QR code applications as an enjoyable experience, these applications play an effective role in their purchase decisions. In the literature, it has been supported by various studies that entertainment and enjoyment factors increase consumer interest, and this affects purchasing behavior (Trivedi et al., 2019; Jung et al., 2012).

The correlation coefficient r=0.643 and p value p<0.001. This shows that brand perception exhibits a strong and positive relationship with purchase decision interest above the medium level. Brand perception refers to the perception of how QR code applications reflect the image and values of the brand in the consumer's mind. This finding emphasizes that when consumers perceive QR code applications as an element that supports the image of the brand, this perception may affect their purchase decisions. In particular, the fact that QR code applications strengthen the brand's corporate identity and provide information to consumers explains this strong relationship between brand perception and purchase decisions.

Table 4. Regression Coefficients of the Relationship between Sub-dimensions of Consumer Involvement for QR Code Applications and Purchasing Decision Involvement

Dependent Variable	Independent Variables	Standardized Regression Coefficients	t-statistics	p value	Standard Error
		Beta			
Purchasing Decision Involvement	Hedonic Value	,289	6,174	,000	,054
	Perception Towards The Brand	,466	9,958	,000	,056
R²		,466			
Adjusted R²		,463			
F Statistics		170,564 (p= ,000)			

Source: Authors' calculations

When Table 4 is examined, it was determined that *hedonic value* and *perception towards the brand* variables, which are among the sub-dimensions of "Consumer Involvement for QR Code Applications", affect "Purchasing Decision Involvement" variable at a statistically significant level (p <0.05). In this direction, as seen in Table 4, the regression model formed was found to be generally significant since the F statistics are 170,564 and the p value is ,000. In other words, it is statistically possible to estimate the "Purchasing Decision Involvement" variable with at least one of the 2 sub-dimensions of the "Consumer Involvement for QR Code Applications" scale. According to the table, since p values for *hedonic value* and *perception towards the brand* variables are less than 0.05, sub-dimensions of "Consumer Involvement for QR Code Applications", are statistically significant in explaining "Purchasing Decision Involvement" variable. In addition, the fact that VIF values are less than 10 indicates that there is no multicollinearity between variables. The R and R^2 values in the table show the explanatory power of the model. As a result of the regression analysis, the explanation rate of the independent variables for "Purchasing Decision Involvement" variable was found as 46.6%. In addition, when the coefficients table is examined, it is seen that the biggest contribution / effect to this explanatory is *perception towards the brand* variable.

The regression analysis was conducted to examine the extent to which the sub-dimensions of consumer involvement in QR code applications—Hedonic Value and Brand Perception—predict the dependent variable, Purchasing Decision Involvement. The results, as outlined in Table 4, provide critical insights into the predictive power of these dimensions within the context of phygital marketing.

The regression model demonstrated a strong overall fit, as evidenced by an R2 value of 0.466, indicating that approximately 46.6% of the variance in Purchasing Decision Involvement is explained by Hedonic Value and Brand Perception. The F-statistic for the model was 170.564, and its associated p-value (p<0.001) confirms the statistical significance of the overall regression model. This result underscores the adequacy of the selected predictors in explaining the variation in consumer decision-making involvement.

The standardized beta coefficient for Hedonic Value was 0.289 (t=6.174, p<0.001), indicating a statistically significant and positive effect on Purchasing Decision Involvement. This suggests that when consumers perceive QR code applications as entertaining, engaging, and fun, their level of involvement in purchasing decisions increases. The relatively smaller magnitude of the beta coefficient compared to Brand Perception implies that while Hedonic Value contributes to purchasing decisions, it is less influential than Brand Perception.

This finding aligns with existing literature, which highlights the importance of emotional engagement and enjoyment in influencing consumer behavior (Trivedi et al., 2019). Hedonic Value likely resonates with Generation Z's preference for interactive and pleasurable experiences, positioning it as a crucial factor in phygital marketing strategies.

The standardized beta coefficient for Brand Perception was 0.466 (t=9.958, p<0.001), demonstrating a statistically significant and more substantial positive effect on Purchasing Decision Involvement compared to Hedonic Value. This finding implies that the way QR code applications reinforce a brand's image, values, and trustworthiness plays a more dominant role in shaping consumer purchasing behaviors.

The strong effect of Brand Perception underscores the critical importance of designing QR code applications that enhance the brand's identity and align with consumer expectations. This outcome aligns with theoretical perspectives that emphasize the cognitive aspects of consumer involvement, where brand-related stimuli significantly influence purchasing decisions (Kandemir et al., 2013).

4. Conclusions and Implications

QR code applications are an important tool used in phygital marketing. There is a lot of information that can be given through QR code applications. This information can make a significant contribution to today's market conditions, where consumers tend to experience new purchases (Beşer, 2019). As a matter of fact, when the literature on the effect of QR Code use on consumers is examined, it has been observed that the awareness of QR code use is quite high, especially the generation Z members' interest in QR code applications is much higher than the other generations. All these developments strengthen the expectation that the use of QR codes will become more widespread. Thanks to mobile devices, which are the most important channels of QR code applications, marketers can easily include consumers in their activities and make consumers a part of these applications with informative and entertaining content. For this reason, it would not be wrong to expect that QR code applications, which act as a bridge in the phygital marketing communication consisting of the coexistence of the real world and the digital world, will gain more importance in the next period. The results of this research also confirm this judgment.

On the other hand, the fact that consumer involvement is both a personal feature and a mental state variable is extremely important in terms of QR code

applications, which are an important part of phygital marketing communication. As a matter of fact, a QR code application that consumers are not interested in will not give any positive results or even attract their attention. On the other hand, the mental state change that occurs when the consumer is motivated by the stimuli will not be achieved if the correct QR code applications are not put on the field. Since this will negatively affect the cognitive and emotional evaluations of the consumer, it will not produce the expected behavioral results and therefore will not turn into purchasing behavior. Finally, the insufficient level of consumer involvement in the phygital marketing studies put into practice will also reduce the intensity of their cognitive effort.

As a result of the research, it was determined that there is a moderate and significant relationship between the "Purchasing Decision Involvement" dependent variable and sub-dimensions of "Consumer Involvement for QR Code Applications" independent variables. At the same time, the fact that the variables of *hedonic value* and *perception towards the brand*, which are sub-dimensions of "Consumer Involvement for QR Code Applications", have a statistically significant effect on "Purchasing Decision Involvement" is another result of the study. In this direction, the fact that brands offer QR code applications to the consumer experience can meet the pleasure-oriented expectations of the generation Z and shape their perception towards the brand. QR code applications can also have a significant impact on the "Purchasing Decision Involvement" of the generation Z.

When the literature is examined, the results of the interaction between the phygital marketing variable and some different variables are in line with this study. For example, in the study carried out by Çakın & Yaman (2020), it was found that consumers who shop from Amazon Go, which is a phygital market, are excited and pleased to shop from this market. In a study, it was concluded that the generations that interact with phygital applications in the retail sector are generations X, Y and Z, and these generations are especially interested in phygital experiences using their smartphones. Especially due to the high level of mobile phone usage of the younger generations, creating phygital experiences through the use of mobile technologies provides the opportunity to reach these customers (Van Tichelen, 2019). In a study, it was concluded that 60% of the members of generation Z preferred to shop in physical stores. Another study found that around two-thirds of generation Z consumers use their smartphones to surf the Internet, 59% use mobile devices for price comparisons, and 58% look at product reviews on their screens. For this reason, it is important that brand managers cannot ignore the unity of digital and physical platforms when addressing the generation Z. It should not be forgotten that brand managers who can build a strong bridge between physical and digital platforms can encourage the generation Z to shop and gain their trust (Singh & Shah, 2020).

If a general evaluation is made about the use of QR code applications of the generation Z and their level of involvement for these applications, it can be said that the QR code applications have led to a positive perception on this generation and managed to attract their attention. It is important for brand managers to take their place in different channels by implementing QR code applications, to offer unique

experiences to their customers and to work on personalized services. In future studies, the relationships between the variables of augmented reality and mapping technology, which are among the different applications of phygital marketing, and different variables such as customer satisfaction, customer loyalty, brand value perception, service quality perception can be investigated.

This study contributes significantly to the body of knowledge on phygital marketing by addressing the underexplored role of QR code applications in consumer involvement and purchasing decisions, particularly among Generation Z. The findings highlight the dual role of hedonic value and brand perception as critical dimensions influencing consumer decision-making in phygital contexts. By integrating these dimensions, this study extends existing frameworks of consumer involvement and enriches the theoretical discourse on how hybrid marketing tools impact cognitive and emotional consumer responses. This advancement challenges traditional consumer behavior models, suggesting that engagement mechanisms must now consider the interplay between physical and digital touchpoints.

From a managerial perspective, the results provide actionable insights for brands aiming to connect with Generation Z, a demographic that increasingly values personalized, technology-driven experiences. First, the significant influence of hedonic value emphasizes the importance of creating QR code applications that are not only functional but also entertaining and engaging. For instance, integrating gamified elements or immersive storytelling through QR codes could enhance user engagement. Second, the strong impact of brand perception underscores the need for marketers to ensure that QR codes reflect and amplify the brand's core values and image. This can be achieved by linking QR codes to exclusive content, behind-the-scenes brand stories, or tailored promotional campaigns.

Furthermore, marketers should prioritize the seamless integration of QR codes across multiple channels, ensuring that consumers experience a cohesive journey from offline to online environments. Brands that can effectively utilize QR codes to deliver unique, contextually relevant experiences will likely see an increase in customer involvement and loyalty.

The study also raises implications for regulatory frameworks in digital marketing. As QR codes become more integral to consumer-brand interactions, safeguarding consumer data and ensuring transparency in QR code-enabled campaigns is crucial. Policymakers should collaborate with industry leaders to establish guidelines that promote ethical use of QR codes, protect user privacy, and prevent misuse of data collected through these tools. Establishing such standards can enhance consumer trust while fostering innovation in phygital marketing strategies.

This research opens new avenues for further investigation. Future studies could explore the longitudinal effects of QR code applications on consumer behavior and brand loyalty. Additionally, examining the interplay between other phygital tools, such as augmented reality and virtual reality, and consumer

engagement could provide a broader understanding of the phygital ecosystem. Comparative studies across different cultural or socioeconomic contexts would also offer valuable insights into how diverse consumer groups perceive and interact with QR codes. Lastly, experimental designs could test the effectiveness of various QR code features (e.g., design aesthetics, interactivity levels) in influencing consumer involvement and purchase intention. By addressing these dimensions, future research can build on the foundation laid by this study, further advancing our understanding of phygital marketing's role in shaping consumer behaviors in an increasingly hybrid marketplace.

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